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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/086,655

02/28/2002

E. Henry Stevens

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02/02/2004

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EXAMINER

BERRY, RENEE R

ART UNIT

PAPER NUMBER

2818

DATE MAILED: 02/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/086,655

Applicant(s)

STEVENS, E. HENRY

Examiner

Renee R Berry

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 01 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 52-69 is/are pending in the application.
- 4a) Of the above claim(s) 52-56 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 57-69 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group II is acknowledged.

Claims 52-56 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 57-69 are rejected under 35 U.S.C. 102(e) as being anticipated by US patent no. 6,420,262 to Farrar.

In regards to claim 57, Farrar teaches a method of fabricating interconnect metallization structures on a workpiece, comprising: applying a conductive barrier layer to the workpiece in a film deposition tool set; forming a patterned resist layer on the workpiece, the patterned resist layer being a mask having openings in a pattern of interconnect metallization structure plating a metal into the openings of the resist layer in a wet processing tool set to form the interconnect metallization structures; and altering portions of the barrier layer to electrically isolate the interconnect metallization

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structures from each other in the wet processing tool set at column 7, lines 19-32 and column 8, lines 55-62.

In regards to claim 58, teaches plating a metal into the openings comprises electroplating copper onto exposed portions of the barrier layer in the openings.

In regards to claim 59, teaches applying a seed layer onto the barrier layer in the film deposition tool set, and wherein (a) the openings in the resist layer expose portions of the seed layer and (b) plating a metal into the openings comprises electroplating copper onto the exposed portions of the seed layer.

In regards to claim 60, teaches a protective layer onto surfaces of the interconnect metallization electroplating structures.

In regards to claim 61, Farrar teaches altering portions of the barrier layer to electrically isolate the interconnect metallization structures from each other comprises oxidizing portion: of the barrier layer between the interconnect structures at column 8, lines 42-46.

In regards to claim 62, Farrar teaches altering portions of the barrier layer to electrically isolate the interconnect metallization structures from each other comprises removing portions of the barrier layer between the interconnect structures at column 11, lines 20-26.

In regards to claim 63, Farrar teaches applying a seed layer onto the barrier layer in the film deposition tool set and wherein altering portions of the barrier layer to electrically isolate the interconnect metallization structures from each other comprises

oxidizing portions of the barrier layer between the interconnect structures at column 10, lines 60-67.

In regards to claim 64, Farrar teaches applying a seed layer onto the barrier layer in the film deposition tool set, and wherein altering portions of the barrier layer to electrically isolate the interconnect metallization structures from each other comprises removing portions of the barrier layer between the interconnect structures at column 10, lines 60-65.

In regards to claim 65, Farrar teaches a method of making metal interconnect structures on a workpiece, comprising applying a barrier layer to the workpiece in a first deposition station of a film deposition tool set; applying a copper seed layer to the barrier layer in a second deposition station of the film tool set, forming a patterned mask of a resist on the copper seed layer, the patterned mask having a plurality of openings defining locations for forming raised metal interconnect structures on the seed layer; plating copper onto the copper seed layer in the openings of the patterned mask in a first wet processing station of a wet tool set to form copper interconnect structure; removing the patterned mask in second wet processing station of the wet tool set; and removing portions of the seed layer between the copper interconnect structures in a third wet processing station of the wet tool set at column 9, lines 31-48, Figure 2C.

In regards to claim 66, Farrar teaches plating copper onto the copper seed layer comprises electroplating copper at column 11, lines 36-39.

In regards to claim 67, Farrar teaches plating copper onto the copper seed layer comprises electroplating copper; and removing portions of the seed layer between the

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copper interconnect structures comprises etching the copper seed layer at column 11, lines 30-39.

In regards to claim 68, Farrar teaches plating copper onto the copper seed layer comprises electroplating copper; and the method further comprises exposing the workpiece to an oxygen-containing environment to form a first oxide on the copper interconnect structures, removing the first oxide over the copper interconnect structures, and plating a protective layer onto surfaces of the copper Interconnect structures at column 11, lines 10-39.

In regard to claim 69, Farrar teaches removing portions of the seed layer between the copper interconnect structures comprises removing the second oxide from between the copper interconnect structures at column 11, lines 20-27.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Renee R Berry whose telephone number is (571) 272-1174. The examiner can normally be reached on M-F 9-5:30.



RRB

December 12, 2002



David Nelms
Supervisory Patent Examiner
Technology Center 2800